

near azeotropic compositions, based on difluoromethoxy-bis(difluoromethyl ether) and/or 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether, [essentially] consisting essentially of:

		composition % by weight
I)	difluoromethoxy bis(difluoromethyl ether) ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); n-pentane	1-95 99-5
II)	difluoromethoxy bis(difluoromethyl ether) ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); iso-pentane	1-99 99-1
III)	difluoromethoxy bis(difluoromethyl ether) ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); dimethyl ketone (acetone)	1-60 99-40
IV)	difluoromethoxy bis(difluoromethyl ether) ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); 1,1,1,3,3-pentafluorobutane ($\text{CF}_3\text{CH}_2\text{CF}_2\text{CH}_3$, HFC 365 mfc)	1-99 99-1
V)	difluoromethoxy bis(difluoromethyl ether) ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); 1,1,1,4,4,4-hexafluorobutane ($\text{CF}_3\text{CH}_2\text{CH}_2\text{CF}_3$, HFC 356 ffa)	1-40 99-60
VI)	[difluoromethoxy] <u>difluoromethoxy</u> bis(difluoromethyl ether) ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); methoxymethyl methylether	1-96 99-14
VII)	difluoromethoxy bis(difluoromethyl ether) ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); n-hexane	30-99 70-1

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VIII)	1-difluoromethoxy 1,1,2,2-tetrafluoroethyl difluoromethyl ether ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); n-pentane	1-93 99-7
IX)	1-difluoromethoxy 1,1,2,2-tetrafluoroethyl difluoromethyl ether ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); dimethyl ketone (acetone)	30-99 70-1
X)	1-difluoromethoxy 1,1,2,2-tetrafluoroethyl difluoromethyl ether ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); n-hexane	15-99 85-1
XI)	1-difluoromethoxy 1,1,2,2-tetrafluoroethyl difluoromethyl ether ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); ethyl alcohol	5-99 95-1.

2. (Amended) [Use of azeotropic or near azeotropic compositions according to]

The process of claim 1, wherein said foaming agents consist essentially

[consisting] of:

	composition % by weight
I) difluoromethoxy bis(difluoromethyl ether) ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); n-pentane	25-95 75-5
II) difluoromethoxy bis(difluoromethyl ether) ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); iso-pentane	25-98 75-2

III)	difluoromethoxy bis(difluoromethyl ether) ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); dimethyl ketone (acetone)	20-60 80-40
IV)	difluoromethoxy bis(difluoromethyl ether) ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); 1,1,1,3,3-pentafluorobutane ($\text{CF}_3\text{CH}_2\text{CF}_2\text{CH}_3$, HFC 365 mfc)	10-98 90-2
V)	difluoromethoxy bis(difluoromethyl ether) ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); 1,1,1,4,4,4-hexafluorobutane ($\text{CF}_3\text{CH}_2\text{CH}_2\text{CF}_3$, HFC 356 ffa)	10-40 90-60
VI)	[difluoromethoxy] <u>difluoromethoxy</u> bis(difluoromethyl ether) ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); methoxymethyl methylether	25-96 75-14
VII)	difluoromethoxy bis(difluoromethyl ether) ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); n-hexane	35-98 65-2
VIII)	1-difluoromethoxy 1,1,2,2-tetrafluoroethyl difluoromethyl ether ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); n-pentane	25-93 75-7
IX)	1-difluoromethoxy 1,1,2,2-tetrafluoroethyl difluoromethyl ether ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); dimethyl ketone (acetone)	50-98 50-2
X)	1-difluoromethoxy 1,1,2,2-tetrafluoroethyl difluoromethyl ether ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); n-hexane	25-98 75-2

XI) 1-difluoromethoxy
1,1,2,2-tetrafluoroethyl
difluoromethyl ether 10-98
($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$);
ethyl alcohol 90-2.

3. (Twice Amended) [Use of azeotropic compositions] The process according to claim 1 wherein the azeotropic compositions have [in correspondence of which] an absolute minimum or maximum of the boiling temperature at the pressure of 1.013 bar with respect to the pure products [is noticed,] defined as follows:

- A) difluoromethoxy-bis
(difluoromethyl ether) 62% by wt.
($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); 38% by wt.
n-pentane
- B) difluoromethoxy-
bis(difluoromethyl ether) 63% by wt.
($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); 36% by wt.
iso-pentane
- C) difluoromethoxy-
bis(difluoromethyl ether) 42% by wt.
($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); 58% by wt.
dimethyl ketone (acetone)
- D) difluoromethoxy-
bis(difluoromethyl ether) 60% by wt.
($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); 40% by wt.
1,1,1,3,3-pentafluorobutane
($\text{CF}_3\text{CH}_2\text{CF}_2\text{CH}_3$ HFC 356 mfc)
- E) difluoromethoxy-
bis(difluoromethyl ether) 20% by wt.
($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); 80% by wt.
1,1,1,4,4,4-hexafluorobutane
($\text{CF}_3\text{CH}_2\text{CH}_2\text{CF}_3$ HFC 356 ffa)

- F) difluoromethoxy-bis(difluoromethyl ether) 59% by wt.
 ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$);
 methoxymethyl methyl ether 41% by wt.
- G) difluoromethoxy-bis(difluoromethyl ether) 75% by wt.
 ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$);
 n-hexane 25% by wt.
- H) 1-difluoromethoxy-1,1,2,2-tetra- 61% by wt.
 fluoroethyl difluoromethyl ether
 ($\text{HCF}_2\text{OCF}_2\text{CF}_2\text{OCF}_2\text{H}$);
 n-pentane 39% by wt.
- I) 1-difluoromethoxy-1,1,2,2-tetra- 79% by wt.
 fluoroethyl difluoromethyl ether
 ($\text{HCF}_2\text{OCF}_2\text{CF}_2\text{OCF}_2\text{H}$);
 dimethyl ketone (acetone) 21% by wt.
- L) 1-difluoromethoxy-1,1,2,2-tetra- 74% by wt.
 fluoroethyl difluoromethyl ether
 ($\text{HCF}_2\text{OCF}_2\text{CF}_2\text{OCF}_2\text{H}$);
 n-hexane 26% by wt.
- M) 1-difluoromethoxy-1,1,2,2-tetra- 95% by wt.
 fluoroethyl difluoromethyl ether
 ($\text{HCF}_2\text{OCF}_2\text{CF}_2\text{OCF}_2\text{H}$);
 ethyl alcohol 5% by wt.

4. (Twice Amended) The process [Use as foaming agents of near azeotropic compositions] according to claim 1 wherein said foaming agents consist essentially [consisting] of:

- | | composition
% by weight |
|---|----------------------------|
| II) difluoromethoxy-bis(difluoromethyl ether) <u>with up to 40 parts by weight of</u> | |
| <u>1-difluoromethoxy-1,1,2,2-tetrafluoroethyl</u> | |
| <u>difluoromethyl ether</u> | 1-99 |
| ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$); | |
| iso-pentane | 99-1 |

- III) difluoromethoxy-bis(difluoromethyl ether) with up to 40 parts by weight of 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether 1-60
 (HCF₂OCF₂OCF₂H); 99-40
 dimethyl ketone (acetone)
- IV) difluoromethoxy-bis(difluoromethyl ether) with up to 40 parts by weight of 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether 1-99
 (HCF₂OCF₂OCF₂H); 99-1
 1,1,1,3,3-pentafluorobutane
 (CF₃CH₂CF₂CH₃, HFC 365 mfc)
- V) difluoromethoxy-bis(difluoromethyl ether) with up to 40 parts by weight of 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether 1-40
 (HCF₂OCF₂OCF₂H); 99-60
 1,1,1,4,4,4-hexafluorobutane
 (CF₃CH₂CH₂CF₃, HFC 356 ffa)
- VI) difluoromethoxy-bis(difluoromethyl ether) with up to 40 parts by weight of 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether 1-96
 (HCF₂OCF₂OCF₂H); 99-14
 methoxymethyl methyl ether

[wherein the difluoromethoxy-bis(difluoromethyl ether) part contains up to 40% by weight of 1-difluoromethoxy-1,1,2,2-tetrafluoroethyldifluoromethyl ether].

5. (Twice Amended) The process [Use as foaming agents of near azeotropic compositions] according to claim 1 wherein said foaming agents consist essentially [consisting] of:

composition
% by weight

- IX) 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether with up to 40 parts by weight of 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether (HCF₂OCF₂OCF₂H);
dimethyl ketone (acetone)
- X) 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether with up to 40 parts by weight of 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether (HCF₂OCF₂OCF₂H);
n-hexane

30-99

70-1

15-99

85-1

[wherein 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether contains up to 40% by weight of difluoromethoxy-bis(difluoromethyl ether)].

6. (Twice Amended) The process [Use as foaming agents of near azeotropic compositions] according to claim 1 wherein said foaming agents consist essentially [consisting] of:

composition
% by weight

- I) difluoromethoxy-bis(difluoromethyl ether) with up to 40 parts by weight of 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether (HCF₂OCF₂OCF₂H);
n-pentane

1-95

99-5

- VII) difluoromethoxy-bis(difluoromethyl ether) with up to 40 parts by weight of 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether 30-99
($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$);
n-hexane 70-1

[wherein the difluoromethoxy-bis(difluoromethyl ether) contains up to 50% of 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether].

7. (Twice Amended) The process [Use as foaming agents of near azeotropic compositions] according to claim 1 wherein said foaming agents consist essentially [consisting] of:

- | | composition
% by weight |
|--|----------------------------|
| VIII) 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether <u>with up to 40 parts by weight of 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether</u> ($\text{HCF}_2\text{OCF}_2\text{CF}_2\text{OCF}_2\text{H}$); | 1-93 |
| n-pentane | 99-7 |
| X) 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether <u>with up to 40 parts by weight of 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether</u> ($\text{HCF}_2\text{OCF}_2\text{CF}_2\text{OCF}_2\text{H}$); | 15-99 |
| n-hexane | 85-1 |

[wherein 1-difluoromethoxy-1,1,2,2-tetrafluoroethyl difluoromethyl ether contains up to 50% by weight of difluoromethoxy-bis(difluoromethyl ether)].

8. (Twice Amended) The process [Use as foaming agents of ternary near azeotropic compositions] according to claim 1 wherein said foaming agents consist essentially [consisting] of:

	composition % by weight
XII) difluoromethoxy-bis (difluoromethyl ether) ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$);	1-64
1,1,1,3,3-pentafluorobutane ($\text{CF}_3\text{CH}_2\text{CF}_2\text{CH}_3$, HFC 365 mfc)	98-1
<u>a hydrocarbon selected from</u> <u>n-pentane or isopentane</u>	<u>1-35</u>
XIII) difluoromethoxy-bis (difluoromethyl ether) ($\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$);	1-22
1,1,1,4,4,4-hexafluorobutane ($\text{CF}_3\text{CH}_2\text{CH}_2\text{CF}_3$, HFC 356 ffa)	98-43
<u>a hydrocarbon selected from</u> <u>n-pentane or isopentane</u>	<u>1-35</u>

10. (Twice Amended) The process [Use of compositions] according to claim 8 wherein the hydrocarbon is n-pentane or isopentane and the hydrocarbon is present in the range 1-20% by weight.

11. (Twice Amended) The process [Use of azeotropic or near azeotropic compositions] according to claim 1 wherein [the ether portion HFPE1] $\text{HCF}_2\text{OCF}_2\text{OCF}_2\text{H}$ and/or [HFPE2 can] $\text{HCF}_2\text{OCF}_2\text{CF}_2\text{OCF}_2\text{H}$ contain at least up to 10% by weight of hydrofluoropolyethers having [the same structure but with] a boiling point in the range 5° - 80°C.

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12. (Twice Amended) The process [Use as foaming agents, for the preparation of polyurethanes, of the compositions] according to claim 1, wherein the compositions are selected from [mentioned at points] I, II, IV, V, VI, VII, VIII and X of claim 1 and A, B, D, E, F, G, H and L of claim 3.

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13. (Amended) The process [Use of the compositions] according to claim 12, wherein said compositions are added in amounts in the range 1-15% by weight based on the total preparation[, including the same foaming agent; preferably 1.5-10% by weight, more preferably 1.5-8% by weight on the total formulation for the foam preparation].

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14. (Amended) The process [Use of the compositions] according to claim 12, wherein the azeotropic or near azeotropic compositions are used in combination with H₂O and/or CO₂.

15. (Amended) Use of the compositions according to claim 14, wherein the water amount is in the range 0.5-7[, preferably 1-6, and more preferably 1-4] parts by weight on one hundred parts of polyol.

16. (Amended) The process [Use of the compositions] according to claim 14 wherein the CO₂ amount is in the range 0.6-10 [parts, preferably 1-8] parts by weight on one hundred parts of polyol.

17. (Twice Amended) The process [Use of the compositions] according to claim 1 wherein stabilizers for radicalic decomposition reactions are added, the concentration of which is in the range 0.1 - 5% by weight with respect to the foaming agent.

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18. (Twice Amended) The process [Use as foaming agents for thermoplastic polymers of the compositions] according to claim 1, [mentioned at points] wherein the compositions are selected from I, II, III, VII, VIII, IX, X, XI, XII, and XIII of claim 1, and A, B, C, G, H, I, L and M of claim 3.

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22. (Twice Amended) Polyurethane compositions comprising the foaming compositions [according to claim 12] selected from the foaming compositions: I, II, III, VII, VIII, IX, X, XI, XII, and XIII of claim 1, and A, B, C, G, H, I, L and M of claim 3.

23. (Twice Amended) Compositions of thermoplastic polymers [according to claim 12] selected from the foaming compositions: I, II, IV, V, VI, VII and VIII of claim 1, and A, B, D, E, F, G, H and L of claim 3.

REMARKS

In the Office Action dated October 29, 1999, claims 1-18, 22 and 23, all claims pending in the above-identified U.S. patent application, were rejected. Applicants